Amendments to the Claims

This listing of claims will replace all prior listings of claims in the application.

Listing of Claims

1. (Currently Amended) A diamond electrode comprising synthetically produced, electrically conductive (doped) diamonds, ~~characterized in that it has~~ wherein diamond particles ~~(5)~~ are embedded in the surface of a metal or metal alloy layer so as to produce a conductive connection to the metal or metal alloy.

2. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the locations which are left between the diamond particles ~~(5)~~ at the surface of the electrode are provided with a nonconductive oxide layer ~~(4)~~ and are thereby passivated.

3. (Currently Amended) The diamond electrode as claimed in claim 2, ~~characterized in that~~ wherein the nonconductive oxide layer ~~(4)~~ is covered with a sealing layer, for example a silicate layer.

4. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the embedding layer ~~(3)~~ is applied to a layer of substrate material ~~(2)~~.

5. (Currently Amended) The diamond electrode as claimed in claim 4, ~~characterized in that~~ wherein the layer of substrate material ~~(2)~~ consists of metals or metal alloys passivated by oxides, in particular of titanium, aluminum or of alloys of these metals.

6. (Currently Amended) The diamond electrode as claimed in claim 4, ~~characterized in that~~ wherein the layer of substrate material ~~(2)~~ is insulated on its rear side.

7. (Currently Amended) The diamond electrode as claimed in claim 4, ~~characterized in that~~ wherein the layer of substrate material ~~(2)~~ is provided on both sides with a diamond layer with embedded diamond particles.

8. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the embedding layer ~~(3)~~ at least partially comprises elements which are able to form nonconductive oxides.

9. (Currently Amended) The diamond electrode as claimed in claim 8, ~~characterized in that~~ wherein the embedding layer ~~(3)~~ contains at least one metal selected from the group consisting of magnesium, aluminum, titanium, yttrium, zirconium, hafnium, tantalum, vanadium and zinc.

10. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the diamond particles ~~(5)~~ embedded in the surface of the embedding layer ~~(3)~~ are doped in particular with boron, phosphorus or nitrogen.

11. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the grain size of the diamond particles ~~(5)~~ is between 1 and 700 µm~~, in particular up to 200 µm~~.

12. (Currently Amended) The diamond electrode as claimed in claim 1, ~~characterized in that~~ wherein the grain ~~size~~sizes

of the embedded diamond particles ~~(5)~~ substantially ~~coincides~~coincide with one another.

13. (Currently Amended) A process for producing a diamond electrode, ~~characterized in that~~ wherein a powder formed from doped, electrically conductive, synthetically produced diamonds is embedded at least in the surface of a metal or a metal alloy, in such a manner as to produce a conductive connection between the metal or metal alloy and the diamond particles ~~(5)~~.

14. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the doped diamond particles are introduced directly into a substrate material, which contains at least one element which is able to form a nonconductive oxide layer, by mechanical forces and/or the action of temperature.

15. (Currently Amended) The process as claimed in claim 14, ~~characterized in that~~ wherein the doped diamond particles are pressed or rolled into the surface of the substrate material.

16. (Currently Amended) The process as claimed in claim 14, ~~characterized in that~~ wherein the doped diamond particles are accelerated in fluids and are thereby introduced into the surface when they strike the latter.

17. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the doped diamond particles are mixed with powders of metals or metal alloys which are able to form a nonconductive oxide layer and pressed, so that a pressed part, if appropriate with support plate, is formed, this pressed part containing the diamond particles embedded in

one or more layers.

18. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the doped diamond particles are sintered onto a substrate material.

19. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the metals or metal alloys are deposited from the vapor phase.

20. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein low-melting materials, for example magnesium or a magnesium alloy, which are melted on an in particular metallic substrate layer ~~(2)~~ with a higher melting point, are used as starting material for the embedding layer ~~(3)~~, the diamond powder already having been mixed with the powder of the alloy or then being applied to the still liquid metal and finally being cooled.

21. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein a metal or a metal alloy with diamond powder is deposited by electroplating, with an aqueous solution or a molten salt, in which the diamond powder is held suspension by stirring or the like and is thereby incorporated into the deposited metal, is used.

22. Cancelled.

23. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein conductive metals or metal alloys, which at least partially comprise at least one element which is able to form nonconductive oxides, such as magnesium, aluminum, titanium, yttrium, zirconium, hafnium, tantalum, vanadium or zinc are used for the embedding layer ~~(3)~~ and/or

the substrate material.

24. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the metal surfaces or locations which remain clear between the diamond particles ~~(5)~~ are passivated.

25. (Currently Amended) The process as claimed in claim 24, ~~characterized in that~~ wherein an oxide layer is produced by means of anodic or chemical oxidation for passivation purposes.

26. (Currently Amended) The process as claimed in claim 25, ~~characterized in that~~ wherein the anodic oxidation is carried out by direct current, pulsed direct current or alternating current with the anodic phase period dominating.

27. (Currently Amended) The process as claimed in claim 25, ~~characterized in that~~ wherein in particular aqueous solutions which contain borate, sulfate, phosphate and fluoride ions in combination are used to carry out the anodic oxidation.

28. (Currently Amended) The process as claimed in claim 24, ~~characterized in that~~ wherein the oxidation solutions are buffered.

29. (Currently Amended) The process as claimed in claim 24, ~~characterized in that~~ wherein the oxide layer is sealed.

30. (Currently Amended) The process as claimed in claim 29, ~~characterized in that~~ wherein the oxide layer is subsequently treated with an aqueous silicate which is hardened under air rich in carbon dioxide.

31. (Currently Amended) The process as claimed in claim 29, ~~characterized in that~~ wherein the surface is transformed by the penetration of dissolved metal salts, with or without applied potential, into a layer having properties of a technical-grade ceramic, such as cordierite or sintered corundum.

32. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the doped conductive diamond particles are introduced into the surface of coated substrate materials, in particular coated with Teflon.

33. Cancelled.

34. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the particles of the diamond powder have a grain size of from 1 to 700 µm~~, in particular of up to 200 µm~~.

35. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the particles of the diamond powder are doped with boron, phosphorus or nitrogen.

36. (Currently Amended) The process as claimed in claim 13, ~~characterized in that~~ wherein the particles of the diamond powder have grain sizes at least substantially coinciding ~~grain sizes~~with one another.

37. (New) The process as claimed in claim 34, wherein the particles of the diamond powder have a grain size of up to 200 µm.

38. (New) The process as claimed in claim 11, wherein the grain size of the diamond particles is up to 200 µm.